UNIVERSITY OF PENNSYLVANIA

AN EXPERIMENTAL STUDY OF COMPOSER-PREFERENCES OF FOUR OUTSTANDING SYMPHONY ORCHESTRAS

EMIL E. E. FOLGMANN

A THESIS

IN PSYCHOLOGY

PRESENTED TO THE FACULTY OF THE GRADUATE SCHOOL IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY

PHILADELPHIA
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Reprint from
The Journal of Experimental Psychology, Vol. XVI, No. 5

PHILADELPHIA
1933

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Offprinted from JOURNAL OF EXPERIMENTAL PSYCHOLOGY, Vol. XVI., No. 5, Oct., 1933

AN EXPERIMENTAL STUDY OF COMPOSER-PREFERENCES OF FOUR OUTSTANDING SYMPHONY ORCHESTRAS [1]

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A new method for measuring social attitudes,[2] recently devised by Thurstone, has stimulated other investigators to apply Thurstone's method to the study of attitudes such as religion,[3] pacifism,[4] prohibition,[5] and nationality preferences.

In the present study of composer-preferences, the writer, formerly a member of both the Boston Symphony and the Philadelphia Orchestras, has made use of Thurstone's 'Law of Comparative Judgment' [6] in order to measure quantitatively the preferences for the music of different composers. In the formulation of this experiment, the members of four symphony orchestras were selected as subjects. With regard to the problem itself, scales of preferences were derived not only from the total statistical data of all four orchestras, but also from each orchestra separately. This accomplished, the different orchestral groups were then compared upon the bases of the scales derived.

PROCEDURE

In general, the procedure used has been that employed

[1] The writer wishes to express his gratitude to Professor Samuel W. Fernberger of the University of Pennsylvania for the great interest shown in this study, and valuable suggestions. To Dr. Francis W. Irwin for suggesting the problem and for his ever-ready helpfulness, to Dr. Leon Arons for his constructive criticism and generous outlay of time in assisting in treating the results, the writer also acknowledges his indebtedness,

[2] For a summary and analysis of methods which have been used in studying attitudes, see Droba, D.D., Methods for measuring attitudes, *Psychol. Bull.*, 1932, **29**-309–323.

[3] Chave, E. J. and Thurstone, L.L., A Scale for Measuring Attitude toward God, Chicago: Univ. Chic. Press, 1931.

[4] Droba, D.D., A scale of militarism-pacifism, *J. Educ. Psychol.*, 1931, **22**, 96–111.

[5] Smith, Hattie N., A scale for measuring attitudes about prohibition, *J. Abn. & Soc. Psychol.*, 1932, **26**, 429–437.

[6] Thurstone, L.L., A law of comparative judgment, *Psychol. Rev.*, 1927, **34**, 273–286.

by Thurstone in his study of nationality preferences.[7] The composers to be used in the present study were determined by a preliminary experiment in which 50 music lovers were presented with a list of 40 composers. The Ss (Subjects) were asked to identify, where possible, each composer by giving some composition and several facts concerning the composer in question. Two fictitious names were included as controls. The results demonstrated that certain modern composers were not known to the Ss; and that there was some confusion between the names of several, as, for example, Richard Strauss and Johann Strauss. There was no identification offered for the fictitious names. Composers not well known to the Ss, or those apt to be confused, were not used in the final list. The list was designed so that it might be used, for comparative purposes, with groups other than professional musicians. The writer realizes that his list of composers is not an exhaustive one. However, he feels that it gives an acceptable cross-section of composers of music, and should furnish a valid basis for a scale of composer-preferences.[8] The final list includes 19 composers. These will be found in the tables.

A test schedule was prepared, consisting of:

(*a*) *Instructions*

"This is an experimental study of preferences of the music of different composers. You are asked to underline the name of the one composer of each pair whose *music you prefer* in general, *not* taking the personality or greatness of the composer into consideration.

For example, take the pair:

Puccini—Gounod.

If in general you prefer the music of Puccini to that of Gounod, underline *Puccini*, if on the other hand you prefer the music of Gounod, underline *Gounod*. To make this experiment valid, it is absolutely necessary not to omit any pair, even if it is difficult to make a choice.

[7] A detailed description of the method will be found in: Thurstone, L.L., An experimental study of nationality preferences, *J. Gen. Psychol.*, 1928, 1, 405–425.

[8] It might be well to point out here that the writer has an adequate musical background to bring into service for this study. He is a graduate of the *Royal Academy of Music of Berlin, Germany*, and studied with Professor Robert Haussmann and Professor Hugo Becker. He also has appeared both as a soloist and in chamber music ensemble here and abroad, and, for more than twenty years, has played with symphony orchestras—the Boston Symphony, the National Symphony Orchestra of New York, and the Philadelphia Orchestra. In addition, he has been a member of the faculty of the Department of Music of the University of Pennsylvania.

It is also of the greatest importance not to discuss the experiment with anyone before its completion."

(*b*) 190 pairs made from the list of composers, each composer being paired with every other one. Nineteen of the pairs were duplicates, and were used for 'control.' All pairs were chosen at random.

(*c*) A request for information was made concerning nationality, instrument, etc.

Important:

The following information is requested:

(Name is not necessary) Who was your teacher?.....
What was his nationality?.....

Citizenship:.....
Country of birth:.....
Birth place of father:.....
Birth place of mother:.....
Age:.....
Sex:.....
I play the following instrument:.....
Where did you receive your musical education?.....

It will be noted the name of the musician was not required. This anonymity, the writer feels, was conducive to complete frankness on the part of the Ss.

The schedule was multigraphed on three $8\frac{1}{2}'' \times 11''$ sheets, and was given to the members of four outstanding symphony orchestras, 308 completed schedules were secured.[9] Incomplete records were discarded. Of the 308 Ss, 95 are members of the Philadelphia Orchestra; 75, of the Philharmonic-Symphony Society of New York; 66, of the Boston Symphony Orchestra; and 72, of the Minneapolis Symphony Orchestra. The experiment was begun early in 1932.

Results

The results, both for the individual orchestras and for all taken together, have been treated according to Thurstone's Case V.[10]

The experimental proportions will be found in Tables 1–5. These proportions were derived by dividing the frequency of judgments in a given category, by the total number of judgments.

[9] The writer wishes to express his thanks to the members of the different orchestras for their generous cooperation. He is particularly grateful to Mr. Eugene Ormandy, the Conductor of the Minneapolis Symphony Orchestra, for his kindness in collecting the completed schedules.

[10] See footnote 7.

TABLE 1

EXPERIMENTAL PROPORTIONS PHILADELPHIA ORCHESTRA

	Bach	Beethoven	Berlioz	Brahms	Chopin	Debussy	MacDowell	Cesar Franck	Grieg	Haydn	Vic. Herbert	Mendelssohn	Mozart	Schubert	Schumann	Strawinsky	Tschaikowsky	Verdi	Wagner	Check Column
Bach	—	.453	.074	.432	.063	.179	.032	.053	.032	.126	.021	.053	.389	.179	.137	.084	.095	.074	.274	2.750
Beethoven	.547	—	.084	.432	.074	.168	.021	.063	.042	.105	.032	.053	.274	.105	.063	.116	.063	.074	.284	2.600
Berlioz	.926	.916	—	.968	.484	.895	.126	.547	.274	.821	.158	.653	.947	.884	.726	.589	.621	.495	.937	11.967
Brahms	.568	.568	.032	—	.063	.137	.032	.042	.011	.211	.021	.053	.358	.147	.074	.053	.084	.074	.368	2.896
Chopin	.937	.926	.516	.937	—	.726	.242	.568	.284	.800	.095	.589	.926	.895	.695	.568	.642	.484	.874	11.704
Debussy	.821	.832	.105	.863	.274	—	.053	.053	.063	.558	.053	.295	.811	.642	.347	.221	.263	.189	.758	7.201
MacDowell	.968	.979	.874	.968	.758	.947	—	.916	.800	.916	.379	.916	.989	1.000	.958	.821	.905	.874	.979	15.947
Cesar Franck	.947	.937	.453	.958	.432	.947	.084	—	.242	.842	.126	.568	.916	.884	.747	.589	.589	.411	.926	11.598
Grieg	.968	.958	.726	.989	.716	.937	.200	.758	—	.895	.189	.853	.968	.989	.895	.800	.842	.758	.989	14.430
Haydn	.874	.895	.179	.789	.200	.442	.084	.158	.105	—	.053	.179	.853	.547	.263	.158	.232	.126	.663	6.800
Vic. Herbert	.979	.968	.842	.979	.905	.947	.621	.874	.811	.947	—	.937	.968	.958	.958	.800	.884	.853	.989	16.220
Mendelssohn	.947	.947	.347	.947	.411	.705	.084	.432	.147	.821	.063	—	.916	.853	.632	.547	.484	.337	.884	10.504
Mozart	.611	.726	.053	.642	.074	.189	.011	.084	.032	.147	.032	.084	—	.189	.095	.074	.126	.053	.453	3.675
Schubert	.821	.895	.116	.853	.105	.358	.000	.116	.011	.453	.042	.147	.811	—	.200	.211	.189	.084	.716	6.128
Schumann	.863	.937	.274	.926	.305	.653	.042	.253	.105	.737	.042	.368	.905	.800	—	.389	.368	.232	.811	9.010
Strawinsky	.916	.884	.411	.947	.432	.779	.179	.411	.200	.842	.200	.453	.926	.789	.611	—	.568	.400	.874	10.822
Tschaikowsky	.905	.937	.379	.916	.358	.737	.095	.411	.158	.768	.116	.516	.874	.811	.632	.432	—	.326	.905	10.276
Verdi	.926	.926	.505	.926	.516	.811	.126	.589	.242	.874	.147	.663	.947	.916	.768	.600	.674	—	.947	12.103
Wagner	.726	.716	.063	.632	.126	.242	.021	.074	.011	.337	.011	.116	.547	.284	.189	.126	.095	.053	—	4.369
Σp	15.250	15.400	6.033	15.104	6.296	10.799	2.053	6.402	3.570	11.200	1.780	7.496	14.325	11.872	8.990	7.178	7.724	5.897	13.631	
Rank order	2	1	15	3	14	8	18	13	17	7	19	11	4	6	9	12	10	16	5	

TABLE 2

EXPERIMENTAL PROPORTIONS NEW YORK PHILHARMONIC

	Bach	Beethoven	Berlioz	Brahms	Chopin	Debussy	MacDowell	Cesar Franck	Grieg	Haydn	Vic. Herbert	Mendelssohn	Mozart	Schubert	Schumann	Strawinsky	Tschaikowsky	Verdi	Wagner	Check Column
Bach....	—	.693	.187	.467	.173	.373	.147	.120	.227	.333	.067	.253	.560	.347	.240	.080	.147	.187	.507	5.108
Beethoven.....	.307	—	.107	.227	.027	.093	.040	.040	.053	.107	.053	.107	.200	.133	.080	.067	.027	.120	.333	2.121
Berlioz.....	.813	.893	—	.907	.493	.747	.133	.293	.280	.840	.107	.653	.880	.867	.733	.253	.227	.453	.907	10.479
Brahms.....	.533	.773	.093	—	.120	.200	.013	.107	.067	.293	.053	.200	.480	.320	.213	.040	.080	.173	.533	4.291
Chopin.....	.827	.973	.507	.880	—	.760	.160	.507	.507	.867	.133	.747	.907	.893	.800	.307	.493	.533	.840	11.641
Debussy.....	.627	.907	.253	.800	.240	—	.080	.173	.227	.680	.067	.440	.813	.640	.467	.107	.173	.320	.747	7.761
MacDowell.....	.853	.960	.867	.987	.840	.920	—	.813	.813	.920	.587	.933	.920	.947	.933	.667	.733	.787	.973	15.453
Cesar Franck...	.880	.960	.707	.893	.493	.827	.187	—	.493	.800	.293	.760	.907	.853	.787	.413	.533	.573	.747	12.106
Grieg.....	.773	.947	.720	.933	.493	.773	.187	.507	—	.920	.200	.840	.947	.920	.800	.400	.560	.640	.920	12.480
Haydn.....	.667	.893	.160	.707	.133	.320	.080	.200	.080	—	.027	.347	.760	.533	.387	.093	.160	.160	.667	6.374
Vic. Hervert....	.933	.947	.893	.947	.867	.933	.413	.707	.800	.973	—	1.000	.933	.933	.907	.640	.787	.840	.947	15.400
Mendelssohn....	.747	.893	.347	.800	.253	.560	.067	.240	.160	.653	.000	—	.827	.733	.587	.173	.187	.320	.853	8.400
Mozart.....	.440	.800	.120	.520	.093	.187	.080	.093	.053	.240	.067	.173	—	.253	.227	.027	.093	.147	.507	4.120
Schubert.....	.653	.867	.133	.680	.107	.360	.053	.147	.080	.467	.067	.267	.747	—	.373	.053	.147	.147	.613	5.961
Schumann.....	.760	.920	.267	.787	.200	.533	.067	.213	.200	.613	.093	.413	.773	.627	—	.147	.173	.173	.800	7.759
Strawinsky.....	.920	.933	.747	.960	.693	.893	.333	.587	.600	.907	.360	.827	.973	.947	.853	—	.640	.600	.947	13.720
Tschaikowsky...	.853	.973	.773	.920	.507	.827	.267	.467	.440	.840	.213	.813	.907	.853	.827	.360	—	.533	.907	12.280
Verdi.....	.813	.880	.547	.827	.467	.680	.213	.427	.360	.840	.160	.680	.853	.853	.827	.400	.467	—	.827	11.121
Wagner.....	.493	.667	.093	.467	.160	.253	.027	.253	.080	.333	.053	.147	.493	.387	.200	.053	.093	.173	—	4.425
Σp.....	12.892	15.879	7.521	13.709	6.359	10.239	2.547	5.894	5.520	11.626	2.600	9.600	13.880	12.039	10.241	4.280	5.720	6.879	13.575	
Rank order.....	5	1	11	3	13	9	19	14	16	7	18	10	2	6	8	17	15	12	4	

TABLE 3

EXPERIMENTAL PROPORTIONS BOSTON SYMPHONY

	Bach	Beethoven	Berlioz	Brahms	Chopin	Debussy	MacDowell	Cesar Franck	Grieg	Haydn	Vic. Herbert	Mendelssohn	Mozart	Schubert	Schumann	Strawinsky	Tschaikowsky	Verdi	Wagner	Check Column
Bach	—	.651	.242	.379	.136	.273	.061	.288	.121	.288	.061	.182	.439	.242	.197	.182	.091	.152	.530	4.515
Beethoven	.349	—	.091	.197	.076	.152	.030	.076	.045	.030	.030	.015	.197	.045	.045	.091	.121	.045	.394	2.629
Berlioz	.758	.909	—	.742	.333	.651	.076	.333	.242	.697	.091	.409	.803	.636	.621	.303	.439	.364	.818	9.225
Brahms	.621	.803	.258	—	.182	.333	.045	.273	.136	.258	.045	.106	.545	.227	.288	.212	.136	.106	.621	5.195
Chopin	.864	.924	.667	.818	—	.758	.197	.667	.455	.712	.182	.576	.712	.803	.682	.500	.576	.545	.864	11.502
Debussy	.727	.848	.349	.667	.242	—	.045	.227	.167	.591	.076	.333	.712	.545	.409	.152	.318	.318	.742	7.468
MacDowell	.939	.970	.924	.955	.803	.955	—	.879	.833	.955	.333	.939	.924	.939	.970	.848	.909	.848	.970	15.893
Cesar Franck	.712	.924	.667	.727	.333	.773	.121	—	.273	.651	.076	.485	.788	.667	.636	.424	.500	.364	.833	9.954
Grieg	.879	.955	.758	.864	.545	.833	.167	.727	—	.818	.167	.682	.864	.879	.864	.576	.591	.591	.970	12.730
Haydn	.712	.970	.303	.742	.288	.409	.045	.349	.182	—	.030	.273	.833	.545	.439	.227	.258	.212	.788	7.605
Vic. Herbert	.939	.970	.909	.955	.818	.924	.667	.924	.833	.970	—	.894	.939	.939	.939	.818	.909	.894	.970	16.211
Mendelssohn	.818	.985	.591	.894	.424	.667	.061	.515	.318	.727	.106	—	.894	.803	.682	.455	.500	.439	.939	10.818
Mozart	.561	.803	.197	.455	.288	.288	.076	.212	.136	.167	.061	.106	—	.197	.212	.136	.121	.061	.591	4.668
Schubert	.758	.955	.364	.773	.197	.455	.061	.333	.121	.455	.061	.197	.803	—	.394	.242	.242	.242	.818	7.471
Schumann	.803	.955	.379	.712	.318	.591	.030	.364	.136	.561	.061	.318	.788	.606	—	.273	.333	.242	.818	8.288
Strawinsky	.818	.909	.697	.788	.500	.848	.152	.576	.424	.773	.182	.545	.864	.758	.727	—	.530	.455	.909	11.455
Tschaikowsky	.909	.879	.561	.864	.424	.682	.091	.500	.409	.742	.091	.500	.879	.758	.667	.470	—	.455	.894	10.775
Verdi	.848	.955	.636	.894	.455	.682	.152	.636	.409	.788	.106	.561	.939	.758	.758	.545	.545	—	.909	11.576
Wagner	.470	.606	.182	.379	.136	.258	.030	.167	.030	.212	.030	.061	.409	.182	.182	.091	.106	.091	—	3.622
Σp	13.485	15.371	8.775	12.805	6.498	10.532	2.107	8.046	5.270	10.395	1.789	7.182	13.332	10.529	9.712	6.545	7.225	6.424	14.378	
Rank order	3	1	10	5	15	6	18	11	17	8	19	13	4	7	9	14	12	16	2	

TABLE 4

EXPERIMENTAL PROPORTIONS MINNEAPOLIS SYMPHONY

	Bach	Beethoven	Berlioz	Brahms	Chopin	Debussy	MacDowell	Cesar Franck	Grieg	Haydn	Vic. Herbert	Mendelssohn	Mozart	Schubert	Schumann	Strawinsky	Tschaikowsky	Verdi	Wagner	Check Column
Bach	—	.722	.264	.611	.167	.333	.125	.222	.222	.306	.222	.292	.458	.417	.319	.236	.375	.222	.569	6.082
Beethoven	.278	—	.097	.444	.083	.097	.000	.056	.069	.042	.028	.056	.153	.125	.042	.083	.194	.042	.458	2.347
Berlioz	.736	.903	—	.958	.444	.514	.181	.472	.431	.694	.222	.708	.903	.819	.736	.333	.694	.319	.931	10.998
Brahms	.389	.556	.042	—	.097	.181	.014	.097	.069	.056	.042	.083	.236	.167	.111	.097	.139	.056	.375	2.807
Chopin	.833	.917	.556	.903	—	.681	.278	.528	.458	.736	.181	.750	.931	.875	.708	.403	.750	.361	.931	11.780
Debussy	.667	.903	.486	.819	.319	—	.125	.306	.319	.542	.125	.514	.792	.681	.500	.264	.514	.264	.792	8.932
MacDowell	.875	1.000	.819	.986	.722	.875	—	.792	.847	.903	.611	.944	.986	.986	.847	.583	.875	.722	1.000	15.373
Cesar Franck	.778	.944	.528	.903	.472	.694	.208	—	.458	.708	.250	.681	.861	.861	.750	.333	.694	.375	.931	11.429
Grieg	.778	.931	.569	.931	.542	.681	.153	.542	—	.708	.181	.778	.875	.875	.778	.403	.653	.417	.958	11.753
Haydn	.694	.958	.306	.944	.264	.458	.097	.292	.292	—	.111	.500	.917	.764	.528	.236	.486	.208	.833	8.888
Vic. Herbert	.778	.972	.778	.958	.819	.875	.389	.750	.819	.889	—	.917	.944	.972	.917	.556	.889	.667	.986	14.875
Mendelssohn	.708	.944	.292	.917	.250	.486	.056	.319	.222	.500	.083	—	.833	.722	.472	.264	.472	.181	.819	8.540
Mozart	.542	.847	.097	.764	.069	.208	.014	.139	.125	.083	.056	.167	—	.333	.181	.139	.292	.069	.583	4.708
Schubert	.583	.875	.181	.833	.125	.319	.014	.139	.125	.236	.028	.278	.667	—	.222	.111	.333	.097	.681	5.847
Schumann	.681	.958	.264	.889	.292	.500	.153	.250	.222	.472	.083	.528	.819	.778	—	.208	.458	.208	.819	8.582
Strawinsky	.764	.917	.667	.903	.597	.736	.417	.667	.597	.764	.444	.736	.861	.889	.792	—	.819	.542	.917	13.029
Tschaikowsky	.625	.806	.306	.861	.250	.486	.125	.306	.347	.514	.111	.528	.708	.667	.542	.181	—	.236	.875	8.474
Verdi	.778	.958	.681	.944	.639	.736	.278	.625	.583	.792	.333	.819	.931	.903	.792	.458	.764	—	.944	12.958
Wagner	.431	.542	.069	.625	.069	.208	.000	.069	.042	.167	.014	.181	.417	.319	.181	.083	.125	.056	—	3.598
Σp	11.918	15.653	7.002	15.193	6.220	9.068	2.627	6.571	6.247	9.112	3.125	9.460	13.292	12.153	9.418	4.971	9.526	5.042	14.402	
Rank order	6	1	12	2	15	11	19	13	14	10	18	8	4	5	9	17	7	16	3	

TABLE 5

EXPERIMENTAL PROPORTIONS TOTAL—ALL ORCHESTRAS

	Bach	Beethoven	Berlioz	Brahms	Chopin	Debussy	MacDowell	Cesar Franck	Grieg	Haydn	Vic. Herbert	Mendelssohn	Mozart	Schubert	Schumann	Strawinsky	Tschaikowsky	Verdi	Wagner	Check Column
Bach	—	.617	.182	.471	.183	.282	.088	.159	.143	.253	.088	.185	.458	.289	.218	.140	.172	.153	.455	4.536
Beethoven	.383	—	.094	.334	.065	.130	.023	.058	.052	.075	.036	.058	.211	.104	.058	.091	.097	.071	.360	2.300
Berlioz	.818	.906	—	.903	.445	.718	.127	.422	.305	.769	.146	.614	.890	.812	.708	.386	.536	.416	.903	10.824
Brahms	.529	.666	.097	—	.110	.205	.026	.120	.065	.205	.039	.107	.399	.211	.097	.094	.107	.101	.464	3.642
Chopin	.817	.935	.555	.890	—	.698	.221	.565	.416	.782	.143	.662	.877	.870	.721	.451	.617	.481	.877	11.578
Debussy	.718	.870	.282	.795	.302	—	.075	.179	.185	.591	.078	.390	.786	.630	.425	.188	.312	.266	.760	7.832
MacDowell	.912	.977	.873	.974	.779	.925	—	.854	.821	.922	.474	.932	.958	.971	.929	.734	.857	.812	.981	15.685
Cesar Franck	.841	.942	.578	.880	.435	.821	.146	—	.360	.760	.185	.623	.873	.825	.734	.451	.581	.432	.864	11.331
Grieg	.857	.948	.695	.935	.584	.815	.179	.640	—	.841	.185	.795	.919	.922	.838	.562	.675	.419	.961	12.770
Haydn	.747	.925	.231	.795	.218	.409	.078	.240	.159	—	.055	.315	.841	.594	.393	.182	.279	.172	.731	7.364
Vic. Herbert	.912	.964	.854	.961	.857	.922	.526	.815	.815	.945	—	.938	.948	.951	.932	.708	.867	.815	.974	15.704
Mendelssohn	.815	.942	.386	.893	.338	.610	.068	.377	.205	.685	.062	—	.970	.782	.594	.045	.412	.318	.873	9.375
Mozart	.542	.789	.110	.601	.123	.214	.042	.127	.081	.159	.052	.030	—	.240	.172	.091	.156	.081	.490	4.100
Schubert	.711	.896	.188	.789	.130	.370	.029	.175	.078	.406	.049	.218	.760	—	.289	.149	.224	.136	.705	6.302
Schumann	.782	.942	.292	.903	.279	.575	.071	.266	.162	.607	.068	.406	.828	.711	—	.263	.334	.214	.812	8.515
Strawinsky	.860	.909	.614	.906	.549	.812	.266	.549	.438	.818	.292	.955	.909	.851	.737	—	.640	.494	.909	12.508
Tschaikowsky	.828	.903	.464	.893	.383	.688	.143	.419	.325	.721	.133	.588	.844	.776	.666	.360	—	.383	.896	10.413
Verdi	.847	.929	.584	.899	.519	.734	.188	.568	.581	.828	.185	.682	.919	.864	.786	.506	.617	—	.909	12.145
Wagner	.545	.640	.097	.536	.123	.240	.019	.136	.039	.269	.026	.127	.510	.295	.188	.091	.104	.091	—	4.076
Σp	13.464	15.700	7.176	14.358	6.422	10.168	2.315	6.669	5.230	10.636	2.296	8.625	13.900	11.698	9.485	5.492	7.587	5.855	13.924	
Rank order	5	1	12	2	14	8	18	13	17	7	19	10	4	6	9	16	11	15	3	

TABLE 6

Scale Separations

Phila. Orchestra		New York Philharmonic		Boston Symph.		Minneapolis Symph.		Total	
Beethoven-Bach	.0532	Beethoven-Mozart	.5940	Beethoven-Wagner	.5005	Beethoven-Brahms	.1714	Beethoven-Brahms	.4268
Bach-Brahms	—.0266	Mozart-Brahms	.0557	Wagner-Bach	.3156	Brahms-Wagner	.2263	Brahms-Wagner	.1123
Brahms-Mozart	.2546	Brahms-Wagner	.0574	Bach-Mozart	.0052	Wagner-Mozart	.3120	Wagner-Mozart	—.0258
Mozart-Wagner	.2384	Wagner-Bach	.2059	Mozart-Brahms	.1169	Mozart-Schubert	.3336	Mozart-Bach	.2315
Wagner-Schubert	.5250	Bach-Schubert	.0886	Brahms-Debussy	.5143	Schubert-Bach	.0308	Bach-Schubert	.2986
Schubert-Haydn	.1639	Schubert-Haydn	.1430	Debussy-Schubert	.0402	Bach-Tschaikowsky	.4913	Schubert-Haydn	.3528
Haydn-Debussy	.0305	Haydn-Schumann	.3127	Schubert-Haydn	.0186	Tschaikowsky-Mendelssohn	.0261	Haydn-Debussy	.0908
Debussy-Schumann	.4712	Schumann-Debussy	.2158	Haydn-Schumann	.1325	Mendelssohn-Schumann	.0305	Debussy-Schumann	.1764
Schumann-Tschaikowsky	.3216	Debussy-Mendelssohn	.1446	Schumann-Berlioz	.2181	Schumann-Haydn	.0960	Schumann-Mendelssohn	.1972
Tschaikowsky-Mendelssohn	.0700	Mendelssohn-Berlioz	.5052	Berlioz-Franck	.1459	Haydn-Debussy	—.0499	Mendelssohn-Tschaikowsky	.2248
Mendelssohn-Strawinsky	.0759	Berlioz-Verdi	.1183	Franck-Tschaikowsky	.1972	Debussy-Berlioz	.5478	Tschaikowsky-Berlioz	.0960
Strawinsky-Franck	.2129	Verdi-Chopin	.1116	Tschaikowsky-Mendelssohn	—.0094	Berlioz-Franck	.0328	Berlioz-Franck	.1094
Franck-Chopin	—.0305	Chopin-Franck	.1045	Mendelssohn-Strawinsky	.1587	Franck-Grieg	.0774	Franck-Chopin	.0484
Chopin-Berlioz	.1027	Franck-Tschaikowsky	.0699	Strawinsky-Chopin	—.0030	Grieg-Chopin	.0223	Chopin-Strawinsky	.2464
Berlioz-Verdi	.0134	Tschaikowsky-Grieg	.0817	Chopin-Verdi	—.0097	Chopin-Verdi	.2650	Strawinsky-Verdi	—.1109
Verdi-Grieg	.6558	Grieg-Strawinsky	.3237	Verdi-Grieg	.3461	Verdi-Strawinsky	—.1124	Verdi-Grieg	.1920
Grieg-McDowell	.5536	Strawinsky-Herbert	.4145	Grieg-McDowell	.9311	Strawinsky-Herbert	.6143	Grieg-McDowell	.8815
McDowell-Herbert	.1077	Herbert-McDowell	.0085	McDowell-Herbert	.0432	Herbert-McDowell	.1091	McDowell-Herbert	.0358

In Table 1, the value .547 (column 2, row 3) is to be interpreted that 54.7 percent of the Ss preferred Bach to Beethoven. The values in the column headed 'Check Column' (at the complete right), represent the summation of the rows. The summation of the columns are at the bottom of the table in the row headed 'Σp.' The sum of the column and the row designated by any given composer, should be 18,000, thus providing a check on the operations. The Σp values have been ranked, and will be found in the bottom row ('Rank Order'). These rank orders are used in the determination of the scale separations.

TABLE 7

Scale Values

	Phila. Orch.	New York Phil.	Boston Symph.	Minneapolis Symph.	Total
Bach	−0.0532	−0.9130	−0.8161	−1.0741	−0.7448
Beethoven	0.0000	0.0000	0.0000	0.0000	0.0000
Berlioz	−2.4628	−2.3229	−1.8619	−2.2159	−2.1814
Brahms	−0.0266	−0.6497	−0.9382	−0.1714	−0.4268
Chopin	−2.3601	−2.5528	−2.3513	−2.3484	−2.3392
Debussy	−1.2390	−1.6731	−1.4525	−1.6681	−1.4870
MacDowell	−3.6856	−3.5556	−3.6188	−3.2244	−3.5482
Cesar Franck	−2.3905	−2.6573	−2.0078	−2.2487	−2.2908
Grieg	−3.1320	−2.8089	−2.6877	−2.3261	−2.6667
Haydn	−1.2085	−1.1446	−1.5113	−1.7180	−1.3962
Victor Herbert	−3.7933	−3.5471	−3.6620	−3.1153	−3.5840
Mendelssohn	−2.1018	−1.8177	−2.1956	−1.5915	−1.8606
Mozart	−0.2812	−0.5940	−0.8213	−0.7097	−0.5133
Schubert	−1.0446	−1.0016	−1.4927	−1.0433	−1.0434
Schumann	−1.7102	−1.4573	−1.6438	−1.6220	−1.6634
Strawinsky	−2.1777	−3.1326	−2.3543	−2.5010	−2.5856
Tschaikowsky	−2.0318	−2.7272	−2.2050	−1.5654	−2.0854
Verdi	−2.4762	−2.4412	−2.3416	−2.6134	−2.4747
Wagner	−0.5196	−0.7071	−0.5005	−0.3977	−0.5391

The scale separations are given in Table 6. These separations were determined by using the formula: $S_1 - S_2 = x_{12}\sqrt{2}$.[11] To prepare the data for substitution in the above formula, it was necessary to convert the individual experimental proportions (Tables 1–5) to sigma values, sum these columns, and take the differences, the order in which the columns were taken being determined by the rank order value (Tables 1–5).

The scale values (Table 7) have been derived directly from

[11] See footnote 7, p. 407.

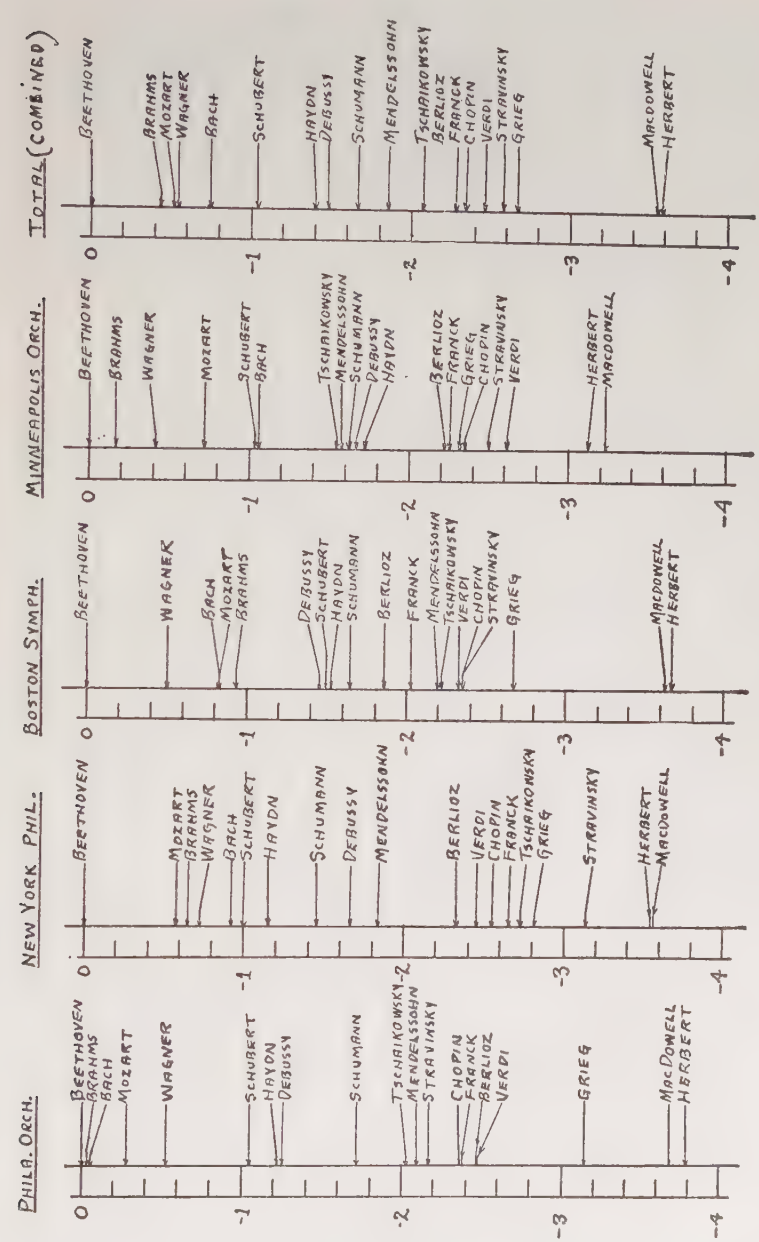

FIG. 1. Scales of Composer-Preferences.

the scale separations. Beethoven, ranking first for all the orchestras, has been taken arbitrarily as the origin (0.000). These scale values have been represented graphically in Fig. 1.

The rank orders of the various composers for the different orchestras have been collected in Table 8. These values have been taken from the scales, and with few exceptions are the same as are to be found in Tables 1–5. The discrepancies may be explained on the basis of changes brought about by the weighting accompanying the conversion of experimental proportions to sigma values.

TABLE 8

Rank Orders for the Different Composers

	Phila. Orch.	N. Y. Phil.	Bost. Symph.	Minn. Symph.	All Orch.
Bach	3	5	3	6	5
Beethoven	1	1	1	1	1
Berlioz	15	11	10	12	12
Brahms	2	3	5	2	2
Chopin	13	13	15	15	14
Debussy	8	9	6	10	8
MacDowell	18	19	18	19	18
Cesar Franck	14	14	11	13	13
Grieg	17	16	17	14	17
Haydn	7	7	8	11	7
Victor Herbert	19	18	19	18	19
Mendelssohn	11	10	12	8	10
Mozart	4	2	4	4	3
Schubert	6	6	7	5	6
Schumann	9	8	9	9	9
Strawinsky	12	17	16	16	16
Tschaikowsky	10	15	13	7	11
Verdi	16	12	14	17	15
Wagner	5	4	2	3	4

Discussion

In examining the scales (Fig. 1), several things are immediately evident: Beethoven is always first; Schumann remains comparatively constant both as to rank order and scale value; and MacDowell and Herbert are consistently last. It will be remembered that Beethoven was taken as the origin of each scale. It is evident, therefore, that the scale values for the other composers in reality represent distance from Beethoven. Beethoven's scale value in itself gives little insight into the question of his relative strength in the four

orchestras. However, we may obtain indices of this strength by examining the Σp values (Tables 1–5) and noting the magnitude of the first scale separation (Table 6). The largest scale separation is that of the New York Philharmonic (.5940), the smallest is that of the Philadelphia Orchestra (.0266). In the case of the New York Philharmonic, the magnitude of this scale separation may indicate the greater relative strength of Beethoven in this orchestra, relative weakness of the immediately succeeding composers, or both. The Σp value (15.879), however, is reasonably higher for this orchestra than for the others, and it seems reasonable to conclude that Beethoven's strength is greatest in this orchestra. In this respect it is interesting to compare the Philadelphia and the Boston Symphony Orchestras. Although the Σp values are almost the same (15.400 and 15.371) yet there is a great difference in the size of the first scale separations (.0266 and .5005). It will be noted that the first scale separation for Boston is not appreciably smaller than that for the New York Philharmonic (.5005 and .5940). It would seem, as a result, that the scale value for Boston gives more of a line on the relative weakness of the next composer (Wagner), than on Beethoven's relative strength in this orchestra.

The Philadelphia Orchestra is distinctive in that while Beethoven is as strong here as in the other orchestras (except the New York Philharmonic), both Brahms and Bach are virtually of equal strength. This is easily evident from an examination of both the Σp and the scale values. The scale values for these three composers are 0.000, — 0.0266 and — 0.0532.

With the exception of the Minneapolis Symphony Orchestra, the scales are approximately of the same length. The scale for the New York Philharmonic has the most uniform distribution of values, indicating comparatively clean-cut preferences. On the other hand, clusterings of names will be found in the scales for the other orchestras.

A most interesting observation for the writer has been the position in the scale for the Philadelphia Orchestra of three composers: Bach, Debussy, and Stravinsky. These three are

higher in this scale than in that for any of the other orchestras. This may be due to the fact that the conductor, Dr. Leopold Stokowski, is himself a great admirer of the three composers. Especially can this be said of Bach. Many of his compositions have been orchestrated by Dr. Stokowski, and these arrangements, still in manuscript, are played only by the Philadelphia Orchestra. The Gothic structure and the substance of Bach's music are brought out more forcefully in these orchestrations. These have been greeted with tremendous enthusiasm both on the part of the musicians and the audiences. They are frequently performed, and it is highly possible that they have enhanced Bach's position with the orchestra membership. Many members of the orchestra have concurred with the writer in this opinion. With regard to Debussy it will be noted that his scale value for the Philadelphia Orchestra is higher than that for the Boston Symphony in spite of the fact that Debussy ranks sixth for Boston and eighth for Philadelphia.

Earlier, Beethoven's greater strength with the New York Philharmonic was indicated.[12] In this connection, Tschaikowsky's very low position in this orchestra also may be pointed out. Mr. Arturo Toscanini, recognized as a great interpreter of Beethoven, is known to have an aversion to Tschaikowsky. Under his leadership, Tschaikowsky is seldom played. It is possible that both Beethoven's greater strength and Tschaikowsky's low position in this orchestra are a reflection of the attitude of its forceful leader.

Undoubtedly, there may be a number of factors affecting preferences for the various composers. Among these may be listed the influence of the conductor, the nationalities represented in the orchestra membership, environmental factors such as location of the orchestra, extra-musical activities of its members, and the different instruments played.

[12] It is interesting to note here the following excerpt by Olin Downes, the eminent music critic, which appeared in *The New York Times*, of April 23, 1933: "The experiment of the cycle of Beethoven symphonies which has brought this series of concerts to an end has been extremely successful and has attracted audiences much larger than any earlier Sunday afternoon audiences of the Winter. This is partly a tribute, and an astonishing one, to the potency of Beethoven's music."

In order to gain an insight into the possible effect of nationality representation in a given orchestra, upon the preferences expressed, a table of nationality distribution has been prepared (Table 9). The criterion of nationality used was that

TABLE 9

NATIONALITY OF Ss IN PERCENTAGES

	Phila.	N. Y.	Bost.	Minn.	Total
American	22.1	5.3	15.2	34.7	19.5
French	3.2	6.7	27.3	6.9	10.1
German	21.1	22.7	18.2	29.2	22.7
Italian	10.5	16.0	4.5	0.0	8.1
Russian	34.7	34.7	15.2	2.8	23.1
Misc.	8.4	14.7	19.7	26.4	16.6
No. of cases	95	75	66	72	308

of the birthplace of the parents. A S, whose parents were born in the same country, was considered to be of that nationality. In the category of miscellaneous ('Misc.') have been included those Ss whose fathers and mothers were born in different countries. Nationalities appearing but infrequently also have been listed in this category.

The table reveals the highest percentage of French to be in the Boston Symphony, and it is interesting to note that Berlioz, Debussy and Franck are placed higher in the scale for this orchestra. Of the 26.4 percent of the membership of the Minneapolis Symphony listed under 'Misc.,' several are Scandinavian. In addition, it is highly possible that some of the 34.7 percent (listed under 'American' in the table) may be of Scandinavian descent. The extent to which the Scandinavian extraction of some of the orchestra members, may have been an important factor in Grieg's unusually high position in the scale for this orchestra, cannot at present be determined. The influence of nationality upon composer-preferences cannot be clearly ascertained from the data on hand. To remedy this factor the writer is planning a further investigation. The influence of the environmental factors listed earlier upon composer-preferences, is obscure and likewise awaits further experimentation.

With reference to the 'control' pairs mentioned in an

earlier section, it may be said that no statistically reliable difference was discovered between the experimental proportions gotten from these pairs and the corresponding experimental proportions which are to be found in Tables 1–5. The records of individual Ss may show shifts of attitude with regard to a given pair. For example, one S reported: "Take Wagner and Tschaikowsky. The first time the pair appeared, I thought of 'Parsifal' and underlined Wagner. The next time I came to the same pair (control pair) I thought of the 'Pathetique Symphony.' I like this symphony and I underlined Tschaikowsky." In view of the occasional shifting of attitude in individual records, it is reassuring that no statistically reliable difference in the experimental proportions resulted when the control pairs were considered, lending additional support to the adequacy of the method used, for a study of composer-preferences.

Summary and Conclusions

Thurston's Law of Comparative Judgment, Case V, was employed in a study of the composer-preferences of four symphony orchestras. Nineteen composers were used and data were secured from 308 Ss who made a total of 58,520 judgments. The scales were constructed and on that basis the orchestras compared. The results show Beethoven to be consistently first for all orchestras, and Herbert and MacDowell last. Schumann's position likewise is rather constant throughout. The remaining composers vary in position from orchestra to orchestra. With the exception of that for the Minneapolis Symphony Orchestra, the scales have approximately the same range. The influence of several factors such as nationality, the personality of the conductor and the location of the orchestra, upon the preferences expressed by the orchestras, has been suggested, and the need for further experimentation indicated.

(Manuscript received May 24, 1933)

LANCASTER PRESS, INC., LANCASTER, PA.